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GENERAL NOTES.

Members and friends of the Society are invited to aid the Committee on Publication in the work of this department. Communications to this end may be sent to FRANK SCHLESINGER, International Latitude Observatory, Ukiah, California.

During 1901 there were discovered thirty-six minor planets, all by photography, and all but one by the astronomers at Heidelberg, Germany. The thirty-sixth, discovered at Arequipa, is an unusually interesting one, its orbit having a large inclination to the ecliptic and having the greatest eccentricity (0.38) of any known minor planet. When discovered the planet was within 29° of the south pole.

Dr. BAUSCHINGER, Director of the Berlin Rechen-Institut, has published a table of statistics of the minor planets discovered up to the end of 1900, which completes the first century of our knowledge of them. The ascending nodes show a decided tendency to cluster in the neighborhood of the ascending node of *Jupiter's* orbit which is in satisfactory agreement with NEWCOMB's theoretical results. There seems to be a slight tendency for great inclinations and great eccentricities to go together; but there is no connection between eccentricity and mean distance. Of the inclinations 315 are under 10° , 133 are between 10° and 20° , 29 between 20° and 30° , and one (*Pallas*) over 30° .

Arranging the planets in the order of mean daily motions, the gaps near $900''$ and $600''$ (that is, three times and twice *Jupiter's* mean daily motion) are very strongly marked. There are other less strongly marked gaps. The minor planets may accordingly be divided into three groups:—

The <i>Mars</i> Group,	with mean daily motions between	$2,015''$	and	$900''$
The <i>Chief</i> Group,	"	"	"	$900''$ " $600''$
The <i>Jupiter</i> Group,	"	"	"	$600''$ " $400''$

These groups number respectively 108, 337, and 18 planets.

Dr. BAUSCHINGER expresses the opinion that very few minor planets brighter than the tenth magnitude remain to be discovered, but that the fainter ones show no signs of exhaustion.

A formula is given for determining the diameters of asteroids, the mean albedo (that is, the reflecting power per unit of surface) being assumed as 0.24, midway between those of *Mars* and *Mercury*. It goes without saying that no stress can be laid upon individual diameters deduced by this method,

especially since we know from Professor BARNARD's measures on the four brightest asteroids that their albedoes vary greatly. Following are the results of Professor BARNARD and Dr. BAUSCHINGER for these four planets:—

	Diameter in Miles.		Albedo.	
	BAUSCHINGER . .	BARNARD.	BAUSCHINGER . .	BARNARD.
<i>Ceres</i>	482	477	0.240	0.195
<i>Pallas</i>	364	304	0.240	0.257
<i>Juno</i>	182	120	0.240	0.488
<i>Vesta</i>	518	239	0.240	0.825

BAUSCHINGER's diameter for *Eros* is 32 kilometers, or 20 miles. It would be 15 miles if the mean of BARNARD's albedoes (0.44) were used.

The volumes of the twelve largest planets (Nos. 1, 2, 3, 4, 7, 9, 10, 15, 16, 22, 29, 349) form two thirds of the volume of all the known minor planets; and since the tiny planets now discovered add so little to the volume, Dr. BAUSCHINGER estimates that the entire family (including those to be discovered) would form a sphere of diameter 1,320 kilometers, or 830 miles. If the albedo 0.44 were used, this diameter would be reduced to 610 miles, or one thirteenth of the Earth's; the corresponding mass is one thirty-three-hundredths of the Earth's, or one fortieth of the Moon's.

Such estimates are apt to be fallacious; for there may be numerous planets of considerable relative mass near *Jupiter's* orbit which are faint, owing to their great distances from the Earth.

Only two new comets were observed in 1901. GIACOBINI's comet, discovered on December 20, 1900, was but little observed, owing to its extreme faintness. It was observed by AITKEN on February 15th, with the 36-inch refractor, but this is an isolated position, as other measures ceased a month earlier. Dr. KREUTZ's short-period ellipse represented the motion of the comet in February, but no further inquiry into the orbit has been made.

The brightest comet of the last twenty years was independently seen at several places in the southern hemisphere, being reported as early as April 12th, at Paysandu. The most northerly station at which it was observed is the Lick Observatory, but the orbit rests entirely on measures taken in the south-

ern hemisphere. It moved through the constellations *Pisces*, *Eridanus*, and *Orion*, nearly parallel with the equator. Mr. MERFIELD, employing three normal places, extending from May 6th to June 6th, derived a very much elongated ellipse, but he appears to prefer a parabolic motion. This comet attracted considerable attention, as the nucleus on May 2d rivaled *Sirius* in luster, being decidedly elliptical in shape, while the tail had in it a dark rift, which gave it a bifurcated appearance.

The only other comet besides these two that has been under observation is that of ENCKE. The preparation of the ephemeris to assist its recovery was undertaken by Dr. THORNBERG of the Kronstadt Observatory, and the comet was found by Professor WILSON, of Northfield, Minn., on August 5th, very near the predicted place.

Two comets passed through perihelion without being seen, although looked for.

J. D. G.

CHANDLER'S researches on the Variations of Latitude have led him to many collateral discoveries of the greatest interest. The most recent of these is his vindication of the *Reflex Zenith-Tube*. This instrument was designed and erected at Greenwich by AIRY, late Astronomer Royal for England. It is capable of measuring with great accuracy the zenith-distance of a star at its culmination, providing that this zenith-distance is not more than a few minutes of arc. If the star is bright enough to be observed during the daytime, and if the observations extend over several years, it is possible thus to determine the numerical values of aberration, nutation, and the star's absolute parallax. Such a series of observations was carried out by AIRY upon the star γ *Draconis*, but with most unsatisfactory results. The observations gave a large negative parallax for the star—manifestly impossible to be real—and a value for the aberration so small as to be out of the question. AIRY sought in vain to find the cause of these discrepancies in the instrument, and finally discontinued the observations with great disappointment in 1882. A few observations (about 300) were made with the instrument by the present administration of the observatory between 1886 and 1899, for the purpose of detecting if possible the cause of the anomalies, but again without satisfactory results. CHANDLER has just shown that when the variation of

latitude (a phenomenon unthought of in AIRY's day) is taken into account, things become completely accounted for, and that the instrument has done a greater service for astronomy than even its builder thought it would do; for the observations made with it enable us to compute the variation of latitude during an early period (1857-1870). Since CHANDLER's investigation has been published Mr. CHRISTIE, the present Astronomer Royal, has stated that the Reflex Zenith-Tube will again be put into service.

Professor W. H. PICKERING calls attention in the Monthly Notices of the Royal Astronomical Society to what he names the "green flash" at sunset. He has noticed several times that for a second or so, at the final disappearance of the Sun's upper limb below the horizon, a distinctly green color is seen. This he accounts for as a subjective phenomenon, or illusion, similar to the complementary color which one sees after gazing intently at a bright surface; as the edge of the Sun looks red at sunset, its withdrawal will leave upon the eye the impression of green. This explanation of PICKERING's is, however, shown not to be the true one by several observers who have reported it at *sun-rise*, just before the edge of the Sun makes its appearance. Lord KELVIN reported this phenomenon as seen at sunrise in the Alps three years ago, and Professor NIJLAND of Utrecht, Holland, has lately seen it several times at sea. No satisfactory explanation has yet been offered. Valuable observations of the "green flash" can be made by any amateur who has access to a site from which the Sun appears to rise or set in the true horizon. Observations may be made with the naked eye, though a small telescope or opera-glasses will be found advantageous. The observer should record failures to see the phenomenon and the general conditions of the sky, the temperature, etc., every time he looks for it.

The General Notes of the last number of these *Publications* contain a notice of KAPTEYN's brilliant suggestion as to the nature of the nebulous light surrounding *Nova Persei*. This theory has received some confirmation since then, and, on the other hand, some contrary evidence has been adduced. The investigations of its parallax indicate on the whole that the

Nova is at the great distance demanded by KAPTEYN's theory. Even more strongly in its favor is the fact pointed out by Mr. RITCHEY, that the appearance of new patches of nebulous light upon the photographs is just what we should expect if we are seeing different sections of dark matter successively lit up by the light of the *Nova*. If what we see were matter flying from the *Nova* with enormous velocities we should expect a certain degree of persistence of form. On the other hand, a telegram from the Lick Observatory announces that PERRINE could find no trace of polarization (the inevitable accompaniment of reflection) in the light of the nebula. For the present we may feel reasonably sure that we have to do with either such a condition as KAPTEYN supposes, or else, as WOLF suggested, with an electrical wave originating in the *Nova*. Still another theory has been advanced, similar to ARRHENIUS's explanation of comet-tails,—namely, that the nebula is being driven from the *Nova* by light-pressure. It would appear that this last theory must be abandoned, as there would result from it an ever-increasing velocity in the expanding nebula; whereas uniform velocity is the observed fact.

Professor E. C. PICKERING announces the receipt of an unconditional gift of \$20,000 to the Harvard Observatory by a friend whose name is not made public. Professor PICKERING states that he intends to expend half of it for the immediate erection of a proper building for storing astronomical photographs, and the other half as needs may arise. The reader is probably aware that Harvard Observatory, in conjunction with its station at Arequipa, takes photographs of the entire sky at frequent intervals. No attempt is made to examine the greater part of these; they are simply stored away for future reference. The great value of these photographs has been proven time and again. They have enabled astronomers to fix the time of the appearance of *Nova Aurigæ* in 1892 and of *Nova Persei* of last year. In a similar way our knowledge of *Eros*, discovered by WITT in 1898, was extended back several years. The first observations of many variables are also to be found on these plates. Professor PICKERING hopes to increase still further the usefulness of this ever-growing collection by making it accessible to all astronomers who care to consult it.

Professor PORTER, Director of the Cincinnati Observatory, states that the observatory is to have a 16-inch equatorial telescope, to be made by the firm of ALVAN CLARK & SONS. A 30-foot dome to accommodate such a telescope was erected at the observatory some years ago. The telescope is to be devoted to researches in the "old" astronomy of precision.

During the recent troubles in China some of the German soldiery removed the quaint astronomical instruments from Pekin's famous observatory and sent them to Berlin. There was considerable feeling in Germany that the instruments should be restored to China, but this is not to be done, as the following extract shows. It is from a speech by the Imperial German Chancellor, before the Reichstag, reported in the *New York Sun* of April 27:—

"The instruments have not been restored because the Chinese Government attaches no importance to their possession, and in reply to German inquiries, it placed them at the disposition of the German Government. Another consideration is, that in accordance with the peculiar views of the Chinese, the great mass of that people would have supposed that the instruments were restored by order of the Chinese Government, which would have damaged German prestige in East Asia. The Dowager Empress of China, a very clever woman who understands the political situation, would have been distinctly offended, while the masses would have thought that Germany had sustained some terrible defeats. The instruments ought now to be placed in the category of presents from government to government, as this has long been customary on both sides in our intercourse with China."

S. W. BURNHAM, whose leisure has been so fruitful of astronomical discoveries, has resigned his office as clerk of the U. S. District Court for the Northern District of Illinois, and intends hereafter to devote all his attention to astronomy.

FRANK E. ROSS (Ph. D., University of California, 1901) has been appointed Computer in the Nautical Almanac Office at the Naval Observatory, Washington, D. C.

J. N. KRIEGER, an astronomer who occupied himself solely in the study of the Moon's surface, died at San Remo, Italy, in February last, in the thirty-seventh year of his age. KRIEGER'S

observations were made at the Pia Observatory, at Triest, Austria. He had planned to publish a complete atlas of the Moon in eight volumes, only one of which, however, had appeared at the time of his death. The material for the other volumes is said to be nearly complete, and no doubt will be published eventually.

On February 24th, RICHARD SCHUMACHER, observer at the Royal Observatory at Kiel, Germany, died at the age of seventy-five years. He was the son of H. C. SCHUMACHER, founder of the *Astronomische Nachrichten*, and had been at various times connected with the observatories at Altona, Santiago (Chile), and Kiel.

ERRATUM.—In these *Publications*, No. 81, page 221, line 24, for 6th magnitude, read 8.6 magnitude.